15 Disruption Due To Construction

15.1 Introduction

This section presents the assessment undertaken to determine the potential disruption to the environmental parameters discussed in Chapters 5 to 14 as a result of construction activities. The assessment uses the guidelines set out in Volume 11 of the DMRB (1993 and amendments).

'Disruption due to construction' is a term that refers to the effects on people and the natural environment that can occur between the start of pre-construction works and the end of the contract maintenance period. At this stage in the road design process the construction period is estimated at twelve months and the maintenance period is likely to be at least five years for the landscape aspects.

Disruption due to construction is usually a localised phenomenon. However, some impacts can create effects over a wide area.

This assessment takes into account nuisance related impacts on local residents, workers, vehicle and non-vehicle travellers arising from noise, vibration, dust, changes in journey times and loss of amenity associated with the operation of equipment or from the movement of heavy construction traffic. Construction activities can impact routes utilised by different types of user including pedestrians and cyclists. There is also the potential for impacts on the natural environment through disturbance associated with drainage, accidental spillage and dust generation as well as effects on ecology and cultural heritage.

In addition to the specific mitigation measures outlined below, the potential impacts of the proposed scheme will be controlled through the development and implementation of appropriate Method Statements and Environmental Management Systems (EMS).

Methods to be implemented during the construction phase are outlined as far as possible in Chapter 2 and will be further developed during the detailed design stage.

15.2 Methods

This assessment has been carried out using the guidelines set out in Volume 11, Section 3, Part 3 of the DMRB (1993 and amendments). A site visit was conducted to verify the location of properties and features, which may be sensitive to disruption.

Resource quality / value and sensitivity criteria that are applied in this assessment of construction phase impacts are as stipulated within the appropriate section of the report (Chapters 5 to 14).

15.3 Baseline Conditions

In accordance with the DMRB, the study area for the assessment of disruption due to

construction comprises a corridor 100m either side of the proposed improvement scheme. Within this corridor there are two properties, Riggsyde and The Shieling, which are located adjacent to the A68. Other potentially sensitive areas within the vicinity of the route corridor comprise those watercourses / drainage ditches (including the Headshaw Burn and the Leader Water) that drain into to the River Tweed SAC.

Baseline conditions for all of the aspects considered in section 15.4 below are discussed in the relevant chapters of this report (Chapters 5 to 14).

Chapter 2 (The Proposed Scheme) describes the key elements of the scheme. It is anticipated that conventional methods of construction will be used for the scheme (section 2.8), although particular attention will be given to the prevention of pollution of watercourses which flow into the Leader Water and the River Tweed SAC. Sections 2.7 and 2.8 provide some information on the likely programme of works, the type of plant and operations required, the traffic management of the scheme and general environmental protection measures including site drainage.

It has not been possible to provide further detailed information on the construction methods and timings that will be involved with the construction of the scheme as the detailed design of the scheme is still to be developed. Methods of construction and mitigation required will then be agreed with the appropriate authorities. However, in order to provide a preliminary assessment of disruption due to construction, indicative mitigation measures have been assumed, as detailed below.

15.4 Assessment of Impacts and Mitigation

15.4.1 Air Quality

Construction works associated with the road improvement scheme have the potential to impact on air quality through dust and increased air pollutants.

Dust

Earthworks and construction works have the potential to generate significant quantities of dust. The earthworks may include topsoil and subsoil stripping, and movement and stockpiling of these materials. Construction works would include installation/diversion of utilities and the proposed roadway itself. Dust also has the potential to be generated by vehicle movements bringing material to site and by site plant.

At present there are no standards for acceptable concentrations of dust. Legislation on dust resides under The Environmental Protection Act 1990 which lists the emission of dust from industrial, trade or business premises in sufficient quantity to be prejudicial to health or a nuisance as a statutory nuisance. The Local Authority is placed under a duty to inspect, to detect any nuisance and to serve abatement notices where necessary. Whether or not a nuisance exists is determined in the first instance by the professional judgment of the Environmental Health Officer.

Dust generated by construction activities may drift beyond the site if uncontrolled. If present in sufficient quantities, dust has the potential to cause a nuisance by settling on clean surfaces. Concerns have also been raised about the possible health effects of inhaling dust particles.

The DETR document 'Environmental Effects of Dust from Surface Mineral Workings' 1995 suggests that large sized particles will largely deposit within 100m of sources and intermediate sized particles are likely to deposit within 250-500m. However, any impact on air quality from dust generated during construction is likely to be short-term and mitigation measures can be implemented to prevent any fugitive dust emissions.

It is unlikely that the construction phase will significantly affect atmospheric dust concentrations and dust deposition, however, as there are two properties located within 100m of construction works, there is potential for an impact upon both people in and around these properties and at the properties themselves. The mitigation measures outlined below can substantially reduce the potential for dust to be generated.

Dust from general traffic at the site during earthworks and construction works will be controlled by regular damping down of public roads / footpaths and by the use of a wheel wash facility.

Other practical measures that will be incorporated as part of a best working practice scheme are detailed in BRE document 'Control of dust from construction and demolition activities'. These include:

- The restriction of site traffic to watered or treated haul roads;
- Minimisation of vehicle movements and limitation of vehicle speeds – the slower the vehicle speeds the lower the dust generation;
- Static and mobile combustion plant engines and exhaust systems should be maintained so that exhaust emissions do not breach statutory emission limits set for the vehicle / equipment type and mode of operation. Plant should be regularly serviced and not left running unnecessarily;
- Minimisation of the duration of the material handling activity and the amount of handling. Material handling methods should also aim to minimise the generation of airborne dust;
- When transporting dusty materials and aggregates, enclosed or sheeted vehicles should be used;
- Protecting surfaces and exposed material from winds until disturbed areas are sealed and stable;
- Exposed stored materials should be damped down and stored as far from sensitive receptors as possible, and

- Activities that generate large amounts of dust should be avoided during windy conditions.

The details of the proposed construction activities and mitigation measures would ideally be discussed in some detail with the Local Authority, once a contractor for the works, has been appointed. Mitigation measures to control dust should be incorporated into the Environmental Management System (EMS) and activity specific method statements, reflecting the requirements of best practicable means (BPM).

Dust generated by construction activities may drift beyond the site if uncontrolled. However, any impact on air quality from dust generated during construction is likely to be short-term and mitigation measures can be implemented to prevent any fugitive dust emissions.

Air Pollutants

There is the potential for an increase in air pollutants due to emissions from the vehicles bringing construction materials to site and from movement of site plant. Additional vehicle emissions will potentially contribute to existing local air pollutant concentrations.

Air pollutants will be generated by HGVs making deliveries to the site and by site plant, which will be in operation for periods during the construction phase.

However, the results of the DMRB assessment have shown that the air pollutants for the base year and future years (do-min and do-som) within 200m of the original and proposed scheme are well below the AQS objectives. The number of site plant and vehicles present will not be significant compared to the number of vehicles using the affected routes. Any impact on air quality from construction derived vehicle emissions is therefore likely to be insignificant.

No significant impacts on air quality will occur during the construction phase of the development, therefore no mitigation measures are proposed.

Air pollutants will be generated by HGVs making deliveries to the site and by site plant, which will be in operation for periods during the construction phase. However, the DMRB results as discussed in the air quality assessment have shown that the air pollutants for the base year and future years (do-min and do-som) within 200m of the affected routes are well below the AQS objectives. Any impact on air quality from construction derived vehicle emissions is likely therefore to be insignificant.

15.4.2 Cultural Heritage

Four areas of cultural heritage have been identified within 100m of the proposed scheme option that may be disrupted during the construction phase. These are the Oxton roman camp (a SAM), Annfield Coaching Inn, the medieval “King’s Road” and the Carfraegate dwelling (Figure 6.1).

The “King’s Road”, Annfield Coaching Inn and Carfraegate dwelling will be affected as they are in close proximity to the proposed new D47/5 link road and proposed A68 widening. Recorded / unrecorded sites may also be affected where the Contractor requires to use areas of land out with the scheme extents for site compounds and storage.

Impacts can be mitigated through implementation of the following measures:

- Preventing access to cultural heritage areas by identifying them in the contract documents and fencing off at the start of the construction period.
- Archaeological monitoring of any works that may cause subsurface disturbance and the excavation and recording of any archaeological features discovered (as identified as committed mitigation in Chapter 6 (Cultural Heritage).
- Inclusion of ‘Special Requirements’ provided by HS into the contract documents and their implementation during construction.

Further consultation will be carried out with HS regarding the evaluation program. This will allow for further examination of the implications that the construction process may have on identified and previously unrecorded sites so that appropriate mitigation can be developed for the preferred scheme where necessary. In overall terms, it is considered that the impact upon cultural heritage during construction could potentially be **major adverse** but with the application of the above mitigation, the residual impact can be reduced to **negligible adverse**.

15.4.3 Land Use

During the construction period, temporary land-take for works and storage areas may adversely affect access to land and properties. Disruptions during this phase will be temporary in nature although, if not adequately managed, the potential impacts could cause significant inconvenience to local residents.

The predicted impacts in the study area are not expected to be significant. However, the Contractor will require a site compound for the duration of the works and the area of land allocated for the permanent works is limited. It is therefore expected that the Contractor will approach a local landowner to obtain an area of land for use as a site compound which, in turn, will cause some disruption to the owner’s use of the land. However, it is likely that the Contractor will have some financial agreement in place with the landowner to compensate for the loss of land use while the compound is in use.

Disruption to the use and access of farmland during the construction phase will be temporary in nature although, if not adequately managed, potential impacts could cause significant inconvenience. Based on likely construction methods, this is considered to potentially be of slight magnitude. With a land value of medium, the overall impact would be **slight adverse** and insignificant.

As the scheme is being constructed along the existing line of the A68 it has been designed so that construction can be undertaken while maintaining at least one lane of the existing carriageway open to traffic throughout the Works. Access to Riggsyde will be affected by the works and a new arrangement will have to be made by the contractor prior to the permanent severance of their direct access to the A68. The overall impact significance is predicted to be **negligible**. Disturbance to the Riggsyde property is predicted to be **negligible** as their direct access is being stopped up as part of the permanent scheme and a new access provided from the new side road.

The nine existing field accesses on the A68 are to be stopped up as part of the scheme and alternative routes and outline accommodation works have been agreed with the landowners / tenants. Therefore there will be no disturbance cause by the construction of the scheme. Accommodation works will be confirmed and agreed with each landowner during the detailed scheme design.

Some degree of disruption to land use during the construction of the scheme will be unavoidable, however, the contractor will be required to provide the following mitigation measures:

- Provide designated temporary access points where accessibility and severance may pose a temporary problem.
- Minimise the area of temporary land-take and the duration of its use.
- Re-instate areas of temporary land-take to their former land use as quickly as possible upon completion of the scheme.
- To avoid any access problems for the residents of Riggsyde, the new access arrangements for the property should be constructed before any works that may cause disruption are undertaken.

Residual construction phase land use impacts are assessed as **slight adverse**.

15.4.4 Ecology and Nature Conservation

Although temporary and of short-term nature, potential impacts on the ecological and nature conservation resources of the site during the construction phase may result in a greater impact than those predicted during the operational phase. For example, accidental pollution of a watercourse during construction (e.g. asphalt mix, chemicals or bridge construction works) could have a significant impact on the Headshaw Burn or Leader Water.

Potential impacts resulting from construction works have been identified as:

- Disturbance to the Headshaw Burn during extension of the Annfield Bridge and installation / removal of sheet piling;

- Pollution of Headshaw Burn and other watercourses, particularly during bridge extension / new side road construction / road widening and culvert replacement;

- Disturbance to otter (both within a place of shelter and movement behaviour); and

- Disturbance due to human activity, noise, dust and light;

Disturbance to the Headshaw Burn during Extension of the Annfield Bridge.

As noted within section 8.4.2, some temporary in-river works are necessary at the Headshaw Burn as part of the widening of the Annfield Bridge. These works will directly affect fish populations due to potential changes to water flows, water quality and fish migration through the bridge and within the watercourse and indirectly through released sediment into the water, which may impact upon downstream fish populations. In addition, construction will have to take into account the possibility of nesting dippers (as identified and assessed previously) and other nesting birds, along with the nearby presence of an otter holt and related otter movements (discussed further below). For the purposes of this EcIA, the watercourses are considered to be of international importance (Table 8.3) and with a potential magnitude impact of major negative, the overall impact significance without mitigation could be **critical adverse** and significant.

As the watercourse within this area is an SAC, the Habitats Regulations (The Conservation (Natural Habitats & c.) Regulations 1994 and subsequent amendments) are applicable and the requirement for an appropriate assessment has been investigated in parallel with the production of this ES, in consultation with SNH. In terms of the requirement for an appropriate assessment, it has been determined through completion of an appropriate assessment by the Competent Authority (Scottish Government) that with the application of appropriate mitigation (identified and agreed with SNH through production of a Construction Method Statement) there will not be an adverse effect on the integrity of the Natura 2000 site.

Mitigation measures that will be applied by the contractor in order to reduce the overall impact include the planning of the extension works to be carried out during the least sensitive times of the year (between July and September [section 2.7]) and the adherence of best practice during construction itself (including piling works for sheet piling and noise disturbances brought about by machinery and plant use. The methods used to install and remove the temporary sheet piling will be carried out by the least disturbing method (such as vibro piling) and the construction works will be completed within a dry working zone, protected by coffer dams. No obstruction to the river banks or the river channel will take place to ensure that otter and fish movements remain uninterrupted and prior to the temporary restriction of water flow under the bridge, a fish rescue will be carried out. Detailed mitigation will be identified and agreed through the application of a Construction Method Statement, as requested by and agreed with

SNH (and as required to address the outstanding issues relating to the Habitats Regulations).

Best practice will include following the requirements of British Standards such as BS5228: Part 4 (1992) 'Code of Practice for noise and vibration control'.

Following the application of the mitigation identified above, the residual impact will be reduced to **slight adverse** and insignificant (minor negative magnitude for features of international nature conservation value).

Pollution of Headshaw Burn and Other Watercourses

Pollution can occur through the discharge of untreated run-off from the construction site, through for example heavy rainfall during soil stripping and ground excavations. It can also occur through accidental spillage of materials into watercourses. There are two structures crossing a watercourse within the proposed road improvements that will require construction works. These are the Annfield Bridge (which requires extension) and the new side road bridge (to be constructed), both of which cross the Headshaw Burn.

The extension of the Annfield Bridge has been assessed above. The new side road bridge will not result in any direct impact to the watercourse itself, but it will require the excavation of ground adjacent to the banks for the construction of 2m long abutments. The bridge itself spans approximately 13m and has been designed so that there is no disturbance to the riparian habitat. During the construction phase, there is a risk that pollution may enter the watercourse indirectly as a result of the excavation and new side road construction works.

Site run-off may be high in suspended solids or contain other construction site pollutants such as fuels, oils, and concrete materials. The transport of suspended and deposited sediment can have both acute and chronic adverse effects on juvenile salmon and trout and also on egg hatching success with silt smothering the gravel in which salmon and trout eggs grow and hatch. In addition, many silts may have a high organic content, increasing the oxygen demand and further compromising egg survival. Physical disturbance to watercourses and pollution may potentially impact on water quality and aquatic habitat, in particular invertebrates, salmon, lamprey, floral species (present within the immediate river channel and further downstream) and terrestrial species feeding in these areas, such as otter. Migratory fish passage through the watercourses and subsequent spawning activity (also described in Chapter 8, Ecology and Nature Conservation) may also be affected. As otter, salmon and lamprey and their associated habitat are of international value and the magnitude of the impact could potentially be major negative, the overall impact significance is considered to be **critical adverse** and significant.

In order to reduce the risk of pollution during construction, the contractor will work in accordance with SEPA's Special Requirements and Pollution Prevention Guidance (PPGs) in addition to the requirements of the agreed Construction Method Statement.

The Construction Method Statement restricts the timing that the excavation works for the new side road bridge can occur within (e.g. outwith the key salmonid / lamprey migration and spawning periods) and details specific pollution control measures to be adopted, such as the erection of screening between the excavations and the watercourse and in-river pollution absorbent materials. The contractor will also be required to produce and implement an EMS prior to the commencement of work on the site. Mitigation measures to be included in an EMS will include, but not be limited to:

- Appropriate storage and containment of site materials to prevent pollution to aquatic and terrestrial habitats and species (designation of specific sites for these materials);
- The use of appropriate site drainage / temporary drainage so that any surface water run-off is contained and treated prior to discharge to the receiving watercourse (installation of adequate temporary treatment facilities such as settlement ponds and filtration systems);
- Use of best practice construction methods (e.g. no cleaning out of concrete wagons / pipework on the site, dust suppression etc.);
- Incorporation of an Emergency Pollution Contingency Plan detailing the system for dealing with emergency spillage or other pollution incidents. This will include the procedure for reporting and contact details for the site manager / responsible environmental engineer / ecological Clerk of Works and SEPA; and
- Adherence to the contents of CIRIA C648 'Control of water pollution from linear construction projects – technical guidance' (2006) and other current documentation outlining best practice.

As well as the Construction Method Statement, authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations 2006 will be obtained from SEPA to allow the new engineering works to proceed. As part of this authorisation all works will be required to meet with Good Practice and follow SEPA Guidance documents such as 'Bank Protection: Rivers and Lochs (SEPA, 2008) and 'Construction of River Crossings' (SEPA, 2008).

It is anticipated that by following the above mitigation measures, the residual impact will be reduced to **slight adverse** and insignificant (minor negative magnitude and international nature conservation value).

Disturbance to Otter (Both Within a Place of Shelter and Movement Behaviour) and Other Animal Species

As mentioned within section 8.3.2, the preferred scheme crosses and runs directly adjacent to watercourses designated as part of the River Tweed SAC. The road and bridge widening will have no direct impact on any otter holts or lying up areas as none

were identified in the construction footprint during surveys, however, for the holt that lies within 30 m of the new carriageway upstream of the Annfield Bridge, measures will need to be implemented to ensure that there is no potential for accidental damage from construction vehicles or disturbance from construction workers. The risk to this internationally valued species is determined to be intermediate negative in magnitude, resulting in a potential overall impact of **major adverse** and significant.

The Annfield Bridge extension work involves limited disturbance to the banks. Although once the bridge extension is complete, otter movements under the bridge will not be compromised, there is a possibility that the extension work could result in partial barriers (such as piling installation or abutment construction) to otter movements along this section of the watercourse, with otter routes displaced onto the banks of the burn or possibly further inland. Due to the bridge widening works, otters would potentially be prevented from passing beneath the bridge, either along the bank or in the river. There is also a risk that the construction of the new side road and the associated bridge may influence otter movement although this is unlikely as works will take place during daytime. As the works are only for a two month period, the magnitude of such an event would be intermediate negative in a worst case and the impact **major adverse** and significant for the purposes of this EcIA.

In order to minimise the risk of otter impediment, by ensuring that otter routes are not disturbed and that there are no blockages to movement this will assist in avoiding the forcing of these protected mammals to cross the A68. The construction works will also be restricted to daylight hours to ensure that peak times for otter and badger activity are avoided. Piling and coffer dams will be installed in a sensitive manner to ensure no blockage of the bridge or water channel. A system will also be set up so that if any mammal road casualties are observed within 100m of the Annfield Bridge during the extension works, this will be reported to the relevant person (such as ecological clerk of works / site ecologist), works will stop immediately and temporary measures put in place to safeguard against further road casualties (such as the erection of professional temporary mammal fencing along the appropriate verge / refined construction procedure to improve natural animal movement under the bridge). This will help to reduce the residual impact of the construction works to **slight adverse** (minor negative) in terms of otter / badger and fish movement.

With respect to the otter holt present within 30m of the proposed road improvements, appropriate mitigation measures will be applied along the same terms as those agreed with SNH and subsequently implemented during the ground investigation work. These measures include the clear demarkation of a boundary zone around the holt, protecting a radius of 10m from the holt. All contractors will be made aware of the sensitivity of the particular area and no site personnel or machinery will be allowed within the boundary zone. Pre-construction surveying of the holt and its status / level of use will be completed in order to ensure that the activity or use of the holt does not change or that there are no new holts (currently the holt is not used as a natal den). The results of this survey and previous surveys will help inform discussions regarding the requirement for a European protected species licence (to allow development to go

ahead) which will be carried out with the Scottish Government (licence issuing authority). Works within 30m of this holt will be completed under licence. Disturbance within 100m of the holt will be managed and kept to a minimum as far as possible by the site manager through proper co-ordination of site activities and an experienced ecologist will be available to attend site if necessary. Any sighting of otters during the daytime while construction is taking place must be reported to the site manager who will then advise the site ecologist and implement any advice / instruction that the ecologist provides. With full implementation of the above mitigation, the residual impact upon the otter holt will be reduced to a minor negative impact magnitude, resulting in an overall impact of **slight adverse**.

Disturbance Due to Human Activity, Noise, Dust and Light

The presence of humans and vehicular activity within and adjacent to the construction working corridor can have the effect of deterring use of the area by certain species, particularly during working hours. The main species likely to be affected are breeding birds, particularly ground-nesting species on surrounding fields, and passerine species using the hedgerows. Birds are likely to be deterred from establishing nest sites close to the main centres of human presence and construction activity although not always, while away from these disturbance sources they will often become habituated to movements such as construction vehicles. The behaviour of these songbirds will already be adjusted to background noise because of proximity to the existing A68. Additional noise resulting from site clearance and construction will be limited to the times of the day when the construction site is active (i.e. during daylight hours), which means that they will not coincide with main periods of dawn and dusk singing activity. The intermediate negative magnitude impact of temporary disturbance on what is considered to be a common breeding bird assemblage along the road alignment of local value is predicted to constitute a **slight adverse** impact in population terms (insignificant).

Mammals, such as otters and badgers, will be less affected by the daytime presence of people and machinery than breeding birds, as they are largely nocturnal. In addition, there are alternative places for resting and shelter within a short distance for both these species.

Although the road widening will not directly affect the nearby holt on Headshaw Burn, it is possible that in the absence of mitigation, otters that may otherwise use it will be deterred by human presence during construction activity. As it is currently not used as a breeding holt and given that otters range over large areas and maintain a number of alternative holt sites, this is assessed as an impact of minor negative magnitude on a receptor of international value. Consequently the impact is predicted to be **slight adverse** and therefore insignificant in terms of this EcIA (although the status of the holt will continue to be monitored and a relevant licence sought from the Scottish Government to ensure legal requirements are met for this European Protected Species, as identified above).

Badgers are unlikely to be affected by the daytime presence of people and machinery, as their setts are sufficiently distant from the proposed works. Badgers are a feature of national value, which combined with an impact of neutral magnitude results in an assessment of **neutral** impact.

As best practice on the site, all drainage / pipelines that are exposed during construction will be capped at the end of each working day to prevent the trapping of mammals. In addition, the programming of work to control disturbance (including noise, vibration, dust and vegetation clearance) to species and their habitats - vegetation clearance should be undertaken outside the bird-breeding season (March to August inclusive).

Along with the pre-construction otter survey discussed above, pre-construction surveys / checks for breeding birds, bat species and badger will be completed prior to the start of works in order to ascertain whether breeding animal species or their habitats are present on or in the vicinity of the construction site (e.g. bat / bat roosts, badger setts or bird nests), Soft felling techniques, ecological supervision during site clearance and other reasonable avoidance measures (RAMs) will be carried out where suitable.

It is unavoidable that site clearance activities will involve disturbance of, or damage to, wildlife that is present in the habitats that are being cleared. The species and groups discussed in this section benefit from varying degrees of statutory protection from damage, so it should be stressed that the concept of an impact in the absence of any mitigation (as assessed below) is purely theoretical in some cases, as mitigation measures – including under licence where appropriate – will be a legal requirement of the construction phase.

During dry weather, wind and/or the use of vehicles on exposed substrates may cause dust to become airborne, with settlement on adjacent vegetation. Measures to suppress dust generation for the benefit of construction site and other workers / residents / motorists are addressed in Chapter 5 (Air Quality) and will be addressed as part of the Environmental Management Plan (EMP). These measures will also have an incidental effect of providing a degree of protection for the ecology of the site. However, even in the absence of such mitigation, dust deposition will represent a **neutral** impact in respect of the kind of habitats present in the vicinity of the works, principally because the kind of vegetation most likely to be adversely affected by dust, e.g. rich bryophyte assemblages, is not present.

While it is likely that some additional illumination may be required at certain locations at either end of the working day during some of the construction phase, the ecological receptors listed in Table 8.3 that are active during those parts of the working day are not particularly sensitive to light pollution. Lighting will not be located over or close to watercourses as far as possible in order to minimise lighting pollution of these features. During the winter working hours when lighting will be required, this may overlap slightly with periods when otters or badgers will be actively foraging. In the absence of mitigation, it is conceivable that insensitive lighting could possibly contribute towards

disturbing the regular movements of these mammals, although a **neutral** impact is predicted from this source of disturbance in isolation and cumulatively.

Overall, in terms of disturbance by human activity, noise, dust and light, the residual impact is **neutral** and insignificant.

Planning to Minimise Environmental Risk

The construction stage will also be based upon principles designed to maintain and enhance the biodiversity of the site. A Contractor's Environmental Management Plan (EMP) will be developed, with activity specific Method Statements for activities in areas of sensitivity, e.g. in the vicinity of the otter holt in particular and all of the watercourses. Contractors will also be required to work to the guidelines contained within SEPA's Pollution Prevention Guidelines (PPG's).

15.4.5 Landscape and Visual Effects

Excavation and construction processes, temporary accommodation works and the use of vehicles and machinery will result in some temporary visual impacts on the occupiers of nearby properties, particularly Riggsyde, and on the road users who would normally experience largely open views of the surrounding countryside. The use of temporary floodlighting for safety and security reasons may also cause visual intrusion, particularly at night.

Adverse visual impact is largely unavoidable during the construction phase. Due to the relatively similar alignment of the road improvement option in relation to the existing A68, it has been assessed as moderate adverse with regard to visual impacts on nearby properties and road users. The appointed contractor will be required to implement the following mitigation measures in accordance with the agreed EMS to minimise these potential visual impacts:

- Retaining existing vegetation where appropriate.
- Limiting the size and extent of working and storage areas.
- Ensure good housekeeping of the construction site and storage areas, keeping the site tidy and free of litter and debris so far as is possible.
- Use of temporary floodlighting should be used only when necessary and the lights orientated away from receptors where possible.

Taking into account the above mitigation measures, residual visual impacts are anticipated to remain **moderately adverse** during the construction of the preferred scheme.

15.4.6 Traffic Noise and Vibration

Noise and vibration creates temporary but unavoidable disturbances during construction works, which may affect residential properties and local wildlife (considered to be **moderate adverse**). The contractor will be required to apply best management practices and produce a method statement as part of the EMS to demonstrate commitment to minimisation of noise and vibration levels during the course of the works.

Proactive mitigation measures will include:

- Programming works to be undertaken during normal working hours whenever possible.
- Where it is not possible to undertake work during normal working hours, nearby residents should be informed of the duration and potential noise intensity expected.
- Adherence to noise levels below the standard thresholds set by SBC Environmental Health Officer.
- Any particularly noisy construction works should be undertaken outside of recognised breeding seasons for sensitive species.

Taking into account the above mitigation measures, noise and vibration residual impacts are anticipated to be **moderate adverse** during the construction of the preferred option. However, it should be noted that only two residential properties, Riggsyde and The Shieling, are within 100m of the scheme options and will be moderately affected. Other properties at a greater distance will only be slightly affected.

15.4.7 Pedestrians, Cyclists, Equestrians and Community Effects

Any disruption to non-vehicle road users will be temporary in nature. Nevertheless, if the works are not appropriately managed, these user groups can experience significant inconvenience.

There is very little community movement along the A68, however access is required to access the Carfraemill Hotel located at the roundabout to the south of the proposed scheme. The C83 and D47/5 junctions are used by pedestrians and equestrians as a crossing point over the A68. In relation to these movements there will be disruption caused by the construction works, however this has been assessed as negligible (for low value) with the requirement of the Contractor to provide alternative routes. Within the preferred scheme this crossing point will be replaced with a pedestrian / equestrian / cyclist underpass and the C83 will be stopped up, excluding vehicular access. Therefore, there will be disruption caused by the construction, however alternative provisions will be provided by the Contractor. Overall, such affects are assessed to be

of **negligible** impact (slight adverse magnitude) and insignificant given the limited use of the routes.

Although there are very low numbers of pedestrian, cyclist and equestrian journeys within the study area, the following best practice will be implemented:

- Fencing off works and providing clear signage to avoid any users from entering restricted areas.
- Provision of designated temporary access routes where appropriate.

Taking into consideration the best practice measures identified above, the temporary nature of the impacts and the infrequent occurrence of non-vehicle user activity within the area, the residual impacts during the construction phase are considered to be **negligible**.

15.4.8 Vehicle Travellers

During the construction period driver views will be temporarily altered and impaired by the construction works, the temporary accommodation works and the presence of on-site plant. The use of temporary floodlighting may also result in some impact to driver views at night. Although temporary in nature and extent, these works will impact on the existing views from the A68 to the surrounding agricultural land. Due to the medium sensitivity of these views and predicted moderate adverse magnitude of impacts the impact significance is assessed as **moderate adverse** and therefore significant.

With regard to driver stress it is unavoidable that temporary, unfamiliar traffic conditions will occur during the construction period, which may result in an increase in driver stress. For example, a number of heavy goods vehicles and a variety of construction plant will be accessing and egressing the site and is expected to result in notable disruptions. Disturbance is most likely to occur in the construction of the A68 on-line widening, which will require traffic control for the majority of the works. There will likely be an increase in driver stress associated with any increase in journey times caused by the works (medium sensitivity). As such the impact of the construction phase on driver stress has been assessed as **moderate adverse** and therefore significant.

Measures to mitigate these impacts may include the following:

- Limiting the size and extent of working areas.
- Installation of advanced warning signs and a traffic management system to maintain a continuous flow of traffic on the A68 when possible.
- Good housekeeping of the construction site and storage areas.
- Notifying local radio stations and media to make the public aware of the delays that can be expected.
- Use of temporary floodlighting should be used only when necessary and

the lights orientated away from receptors where possible.

Accounting for mitigation, construction stage impacts upon vehicle travellers in terms of driver views and driver stress will remain **moderate adverse**.

15.4.9 Road Drainage and the Water Environment

There may be impacts on the hydrological characteristics and water quality of the Headshaw Burn and the Leader Water and their associated catchment areas during the construction phase. This may occur due to the following:

- Temporary disruption to hydrological flows during construction (i.e. Annfield bridge extension).
- Accidental spillage / mobilisation of sediments into local watercourses.
- Accidental spillage of liquid contaminants into local watercourses.
- Inputs of leachate derived from on-site stored construction materials.

Certain effects are also applicable to the operational stage of the scheme and these aspects are discussed in Chapter 13.

The Leader Water, Headshaw Burn and Mountmill Burn are included in the River Tweed SAC, designated under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna. The River Tweed is also a SSSI. The Tweed Foundation has confirmed that the Leader Water in the Oxton area contains salmon and brown trout and is likely to contain lamprey, therefore this is reflected by the A1 water classification. Works within close proximity to watercourses will require careful management to minimise the potential impacts on the aquatic environment. Details of the requirements, under the Water Environment (Controlled Activities)(Scotland) Regulations 2006, in relation to the construction of the drainage regime and bridge extension will be finalised through consultations with SEPA at the detailed design stage. A Construction Method Statement has also been produced as part of the appropriate assessment process completed in accordance with the Habitats Regulations.

Overall construction phase impacts upon surface water resources are assessed as **moderate / large adverse**, although there is always a risk of major adverse impacts associated with serious spillages. This is based on the proximity of the Headshaw Burn and the Leader Water to construction activity where potentially contaminative materials will be used. Potential impacts upon groundwater are anticipated to be **neutral**.

In order to safeguard against potentially adverse impacts on water quality and drainage, all works during the construction phase will be carried out in line with best practice guidelines, including SEPA's Special Requirements and Pollution Prevention

Guidelines. SEPA will be consulted to determine the number, type and scale of prevention measures required. Development of procedures as part of the EMS will provide a mechanism to control potential impacts.

Additional mitigation measures will include:

- Appropriate storage for on-site materials to prevent potentially contaminating spillage events.
- The provision of temporary silt traps, containment bunds and storage reservoirs of adequate size, in order to prevent sediments entering local watercourses and to minimise soil erosion.
- The provision of clearly defined 'no access' areas indicated on site plans and on site adjacent to sensitive watercourses, along with the installation of protective fencing to prevent unauthorised staff, plant and machinery access.
- Contingency procedures in case of emergencies.

Adherence to SEPA guidelines and application of the above mitigation measures will result in a residual **slight adverse** impact on water quality and hydrological impacts upon the Headshaw Burn, Leader Water and associated catchments. Residual impact for groundwater remains at **neutral**.

15.4.10 Geology and Soils

The proposed scheme will require approximately 11,400 cubic metres of cut and 22,300 cubic metres of fill material. These estimates are indicative and earthwork volumes are currently being considered in more detail as the proposed scheme design develops. Within this scheme it is not going to be possible to achieve an earthwork balance and imported acceptable material will have to be brought to site. The new side road is located in an area which includes some soft clay and approximately 2,700 cubic metres of material will have to be excavated and replaced with suitable fill. Allowance has been made for this in the earthworks volumes given above. In terms of disruption due to construction, the 10,900 cubic metres deficit in material required to construct the scheme, in addition to the 2,700 cubic metres of unacceptable material that will have to be taken off site, will equate to approximately 1765 lorry loads of material being delivered to/off the site (based on an average lorry load of 7.7 cubic metres). This will have an impact magnitude of moderate, resulting in a **slight adverse** impact, affecting driver frustration with the increase of slower vehicles to the A68. This effect could be significantly minimised if a local material supply source was used as an alternative to the established quarries at Edinburgh, 20 miles from the site.

It is anticipated that some excavated soils will be temporarily stored on site prior to replacement as fill material for embankments. The extent of the works and the exposure of soils during the construction phase are considered to have an impact

magnitude of slight, resulting in a **negligible adverse** impact (insignificant).

Chapter 14 (Geology & Soils) assesses the permanent impact on geology and soils during scheme operation.

The impacts on geology and soils during the construction phase are very similar to the overall scheme impacts. Disturbance to the geological and soil attributes of the construction area will be minimised through the adoption of the following mitigation measures:

- Limitations on the extent and location of working and storage areas.
- Implementation of erosion and sediment controls.
- Appropriate handling and storage of spoil.
- Re-use of excavated materials in the landscaping of road verges wherever possible.

With mitigation the residual impacts on geology and soils can be assessed as **slight adverse** for both options.

15.5 Residual Impacts

Impacts caused during the construction phase of the proposed scheme are typically short-term or temporary in nature. When coupled with the implementation of mitigation measures specified in the Contract and the development of an Environmental Management System by the Contractor prior to the commencement of work on site, many of these impacts can be successfully avoided or reduced. As such, most residual construction phases are assessed as being **slight adverse** with the exception of impacts on drivers views, driver stress, traffic noise and vibration and landscape and visual impacts, which are assessed as **moderate adverse.**